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**Soil. Determination of organic carbon. Potassium dichromate
oxidation spectrophotometric method
(English Translation)**

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9.1 Calculation of results

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Foreword

In order to implement the "Environmental Protection Law of the People's Republic of China", protect the environment, protect human health, and regulate the determination method of organic carbon in soil, Develop this standard.

This standard specifies the potassium dichromate oxidation-spectrophotometry for the determination of organic carbon in soil.

This standard is the first release.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Dalian Environmental Monitoring Center.

This standard is verified by. Tianjin Environmental Monitoring Center, Liaoning

Environmental Monitoring Experimental Center, Shenyang Environmental Monitoring Center Station, Anshan Municipal Environmental Monitoring Center Station, Jinzhou Environmental Monitoring Center Station and Yingkou Environmental Monitoring Center Station.

This standard was approved by the Ministry of Environmental Protection on April 15, 2011.

This standard has been implemented since October 1, 2011.

This standard is explained by the Ministry of Environmental Protection.

Determination of soil organic carbon - Potassium dichromate oxidation - spectrophotometric method

1 Scope of application

This standard specifies the potassium dichromate oxidation-spectrophotometry for the determination of organic carbon in soil.

This standard applies to the determination of organic carbon in air-dried soil. This standard does not apply to chloride ion (Cl-) content greater than 2.0×10^4 mg/kg Determination of salinized soil or salinized soil.

When the sample amount is 0.5 g, the detection limit of the method is 0.06% (by dry weight), and the lower limit of determination is 0.24% (by dry weight).

2 Normative references

The contents of this standard refer to the following documents or their terms. For undated references, the valid version applies to this standard.

HJ 613 Determination of dry matter and moisture in soils - Gravimetric method HJ/T 166 Technical Specifications for Soil Environmental Monitoring

3 Principle of the method

Under heating, the organic carbon in the soil sample is oxidized by excess potassium dichromate-sulfuric acid solution, and hexavalent chromium (Cr6) in potassium dichromate is reduced to trivalent chromium (Cr3), which is proportional to the content of organic carbon in the sample, and the absorbance is measured at 585 nm.

The content of chrome (Cr3) is used to calculate the organic carbon content.

4 Interference and elimination

4.1

The ferrous ion (Fe^{2+}) in the soil leads to a high determination of organic carbon. The soil sample can be spread into 2~ during sample preparation A thin layer of 3 cm thick, fully exposed in air, oxidizes ferrous ions (Fe^{2+}) to ferric ions (Fe^{3+}) to eliminate interference.

4.2

Chloride ion (Cl^-) in the soil results in a high determination of soil organic carbon, which is eliminated by adding an appropriate amount of mercury sulfate.

5 Reagents and materials

Analytical purification reagents in accordance with national standards were used for analysis, unless otherwise stated. The experimental water is ≤ 0.2 mS/m at 25 °C.

Deionized water or distilled water.

5.1

Sulfuric acid. $\rho(\text{H}_2\text{SO}_4) = 1.84$ g/ml.

5.2

Mercury sulfate.

5.3

Potassium dichromate solution. $c(\text{K}_2\text{Cr}_2\text{O}_7) = 0.27$ mol/L.

Weigh 80.00 g of potassium dichromate in an appropriate amount of water, dissolve it, transfer it to a 1 000 ml volumetric flask, dilute to volume with water, and shake well. Solution storage Store in a reagent bottle at 4 °C.

5.4

Standard glucose solution. $\rho(\text{C}_6\text{H}_{12}\text{O}_6) = 10.00$ g/L.

Weigh 10.00 g of glucose in an appropriate amount of water, dissolve it, transfer it to a 1 000 ml volumetric flask, dilute to volume with water, and shake well. The solution is stored in in the reagent bottle, the validity period is one month.

6 Instruments and equipment

6.1

Spectrophotometer. 585 nm wavelength with a 10 mm cuvette.

6.2

Balance. Accuracy is 0.1 mg.

6.3

Constant temperature heater. The temperature control accuracy is $135\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. The constant temperature heater has a heating hole, and the hole depth should be higher than that in the glass tube with a plug the liquid level is about 10 mm, and the plug glass tube is exposed to the heating hole portion of about 150 mm.

6.4

Plug glass tube. With 100 ml mark line, the diameter is 35~45 mm.

Note: The outer wall of the glass tube with the plug must be able to adhere to the inner wall of the heating hole of the thermostat heater, otherwise the digestion is not guaranteed.

6.5

Centrifuge. 0 to 3 000 r/min with a 100 ml centrifuge tube.

6.6

Soil screen. 2 mm (10 mesh), 0.25 mm (60 mesh), stainless steel.

6.7

Common instruments and equipment used in general laboratories.

7.1 Sample collection and preservation

The collection and storage of soil samples refer to the relevant regulations of HJ/T 166.

7.2 Preparation of samples

Place the soil sample in a clean white enamel tray and spread it into a thin layer 2 to 3 cm thick. First remove the residues such as plants, insects, stones, etc.

Crush the clods with rafts, dry naturally, and turn them several times a day when they are dry. Mix the air-dried soil thoroughly, use the quartering method, take two parts, one part Retained, one part was passed through a 2 mm soil sieve for dry matter determination. Remove 10-20 g of the sample from the 2 mm sieve and further finely grind it.

It was placed in a brown stoppered glass via a 60 mesh (0.25 mm) soil sieve for testing.

7.3 Determination of dry matter content

Accurately weigh the appropriate amount of air-dried soil, and determine the dry matter content according to HJ 613.

8.1 Drawing of the calibration curve